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Juechter

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[54] **TELESCOPING WINDOW STABILIZING MECHANISM**

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[51] **Int. Cl.**[4] **E05F 11/38**

[52] **U.S. Cl.** **49/348**; 49/360; 49/375

[58] **Field of Search** 49/348, 349, 350, 351, 49/352, 374, 375, 431, 433, 360, 361, 362, 363

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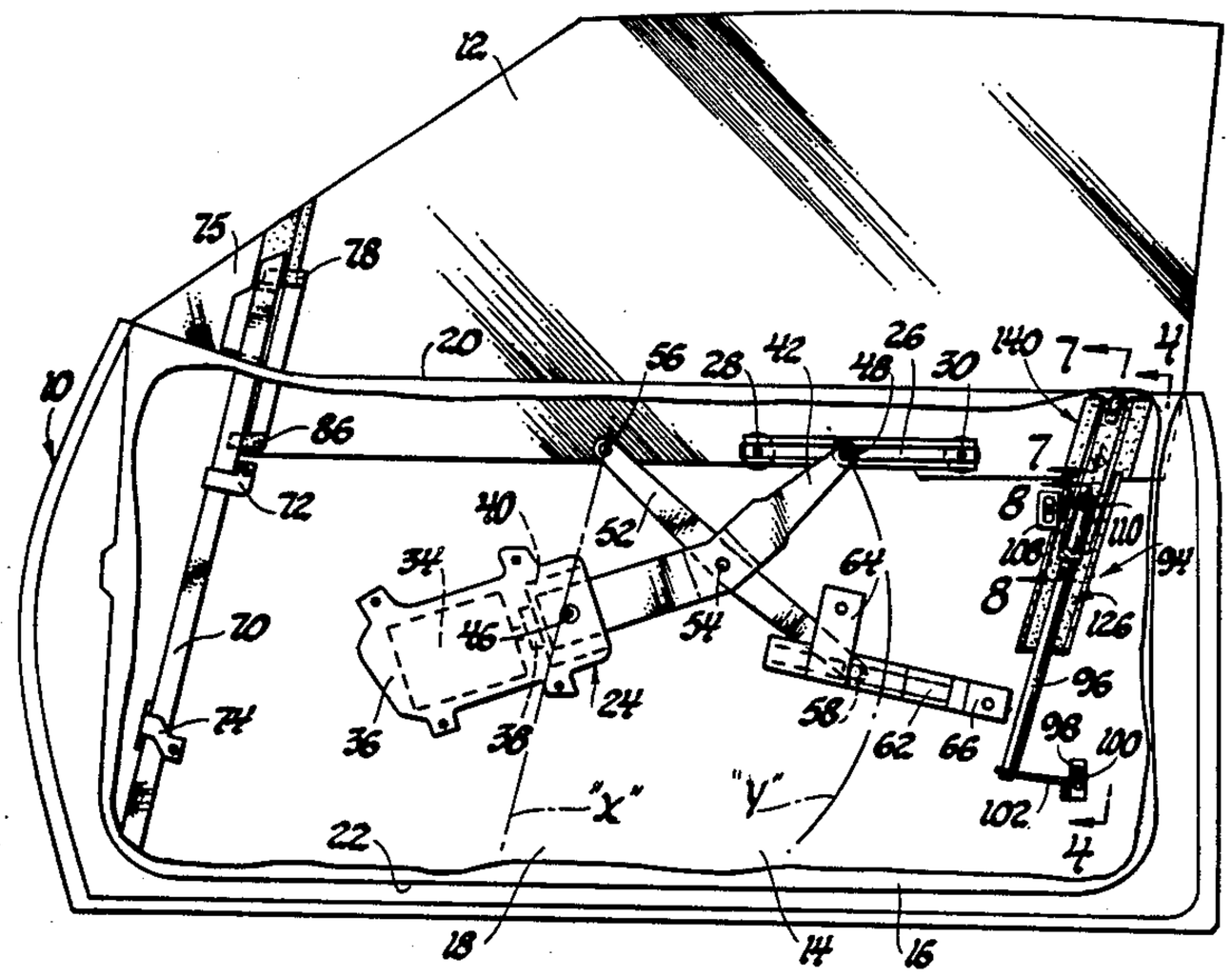
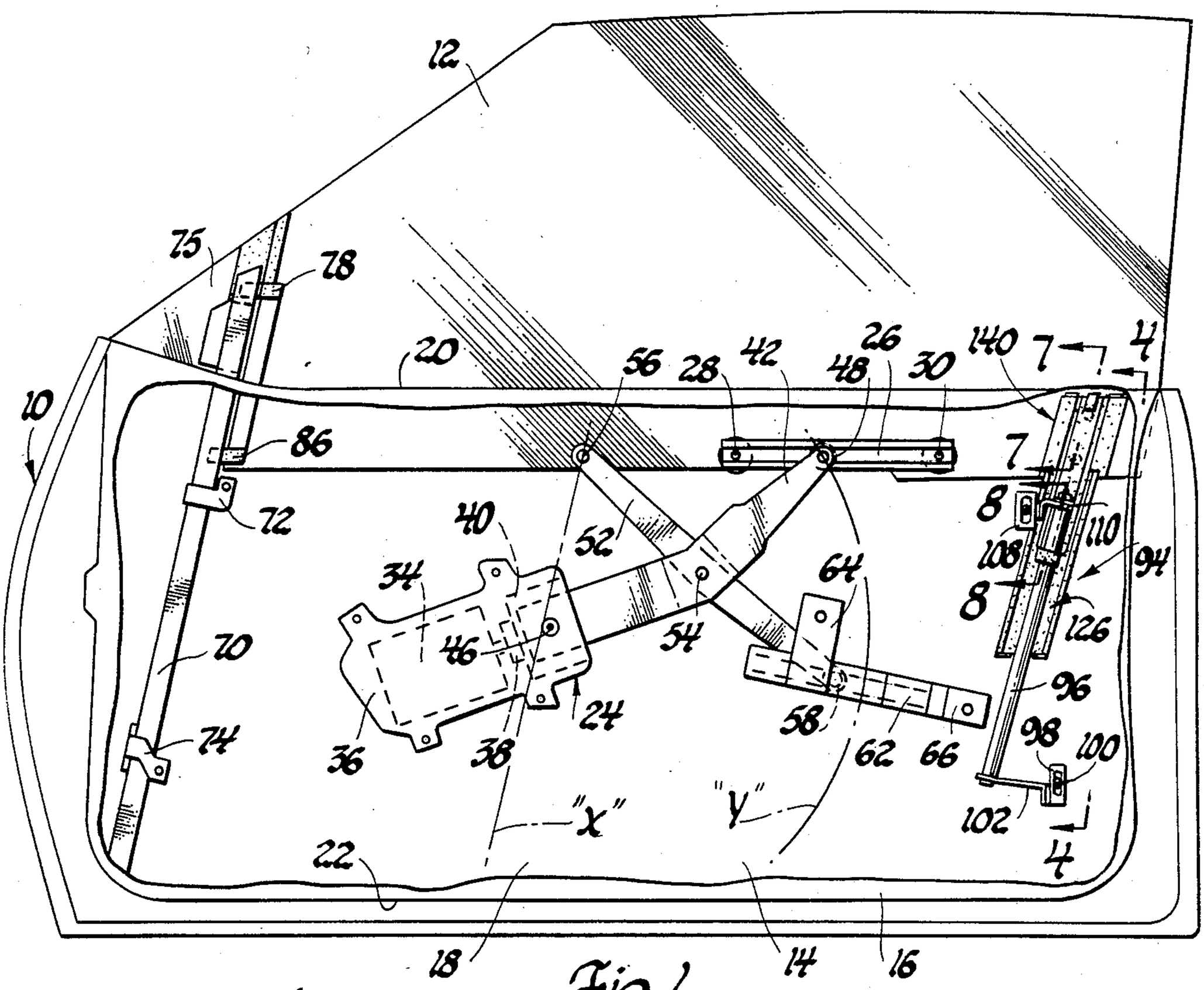
[57] **ABSTRACT**

A mechanism for stablizing the lateral position of a raised window in a vehicle door includes a guide track mounted vertically within the window storage cavity of the door and a stabilizer strut slidably interengaged with the stabilizer strut for vertical movement therealong. A slider channel is attached to the window and slidably interengaged for vertical movement along the stabilizer strut. The slidable interengagement between the slider channel and the stabilizer strut is characterized by tapered walls on the slider channel which provide a small area of frictional contact with the stabilizer strut during sliding movement until the slider channel reaches the fully raised position with respect to the stabilizer strut at which point the tapered walls on the stabilizer strut engage with the tapered walls of the slider channel to provide a full length interengagement therebetween which functions to substantially stabilize the glass laterally of the vehicle in the fully raised position.

3 Claims, 8 Drawing Figures

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"X"
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Fig. 1

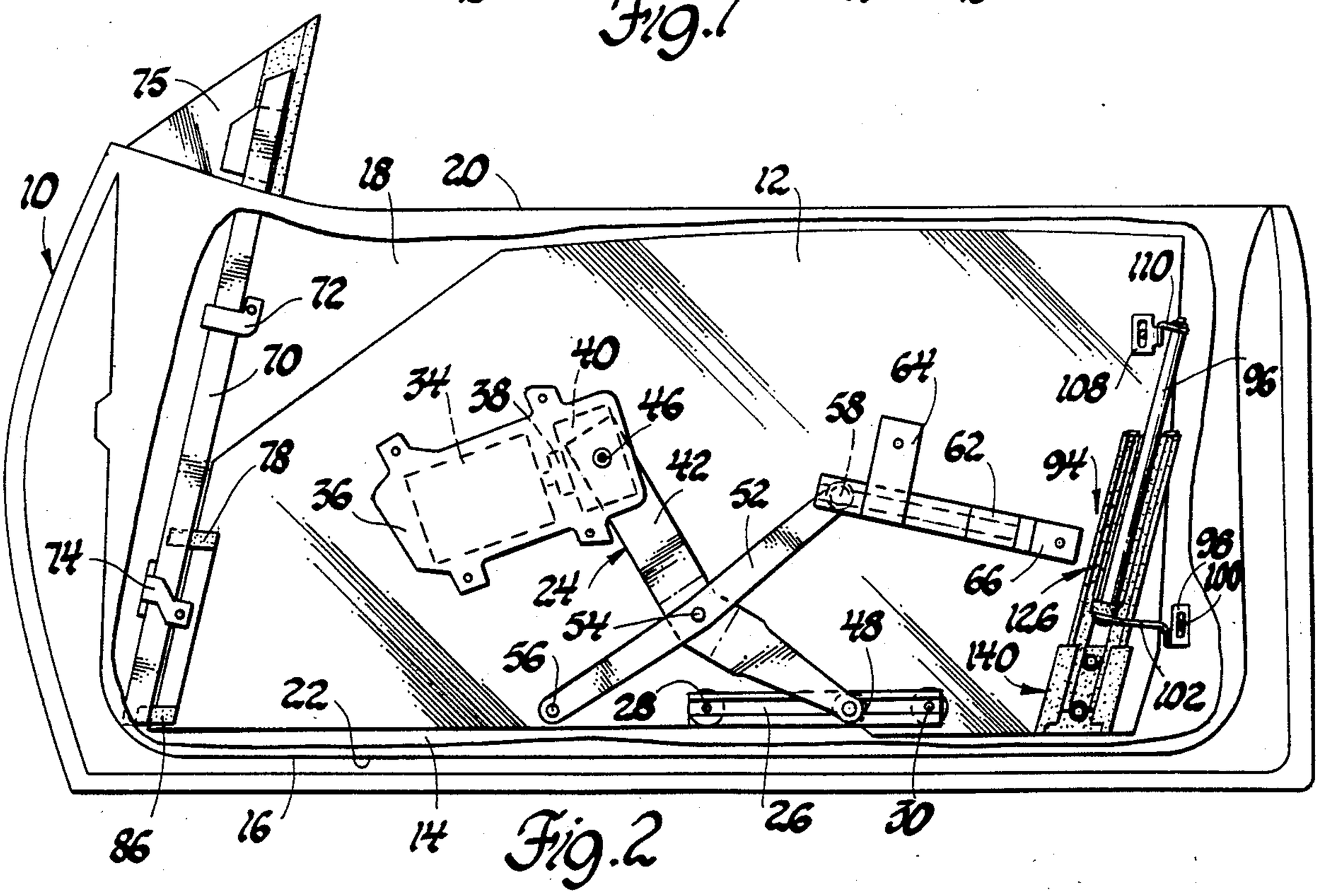
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Fig. 2

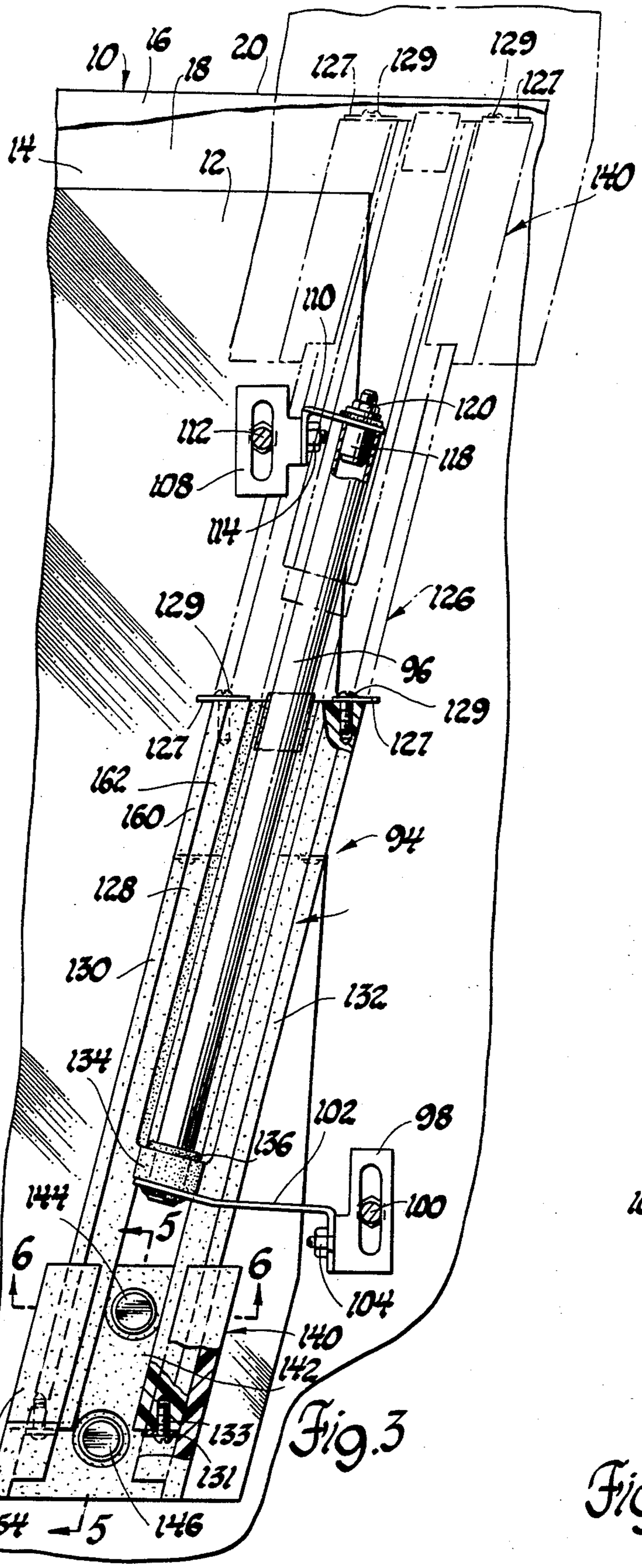
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Fig. 3

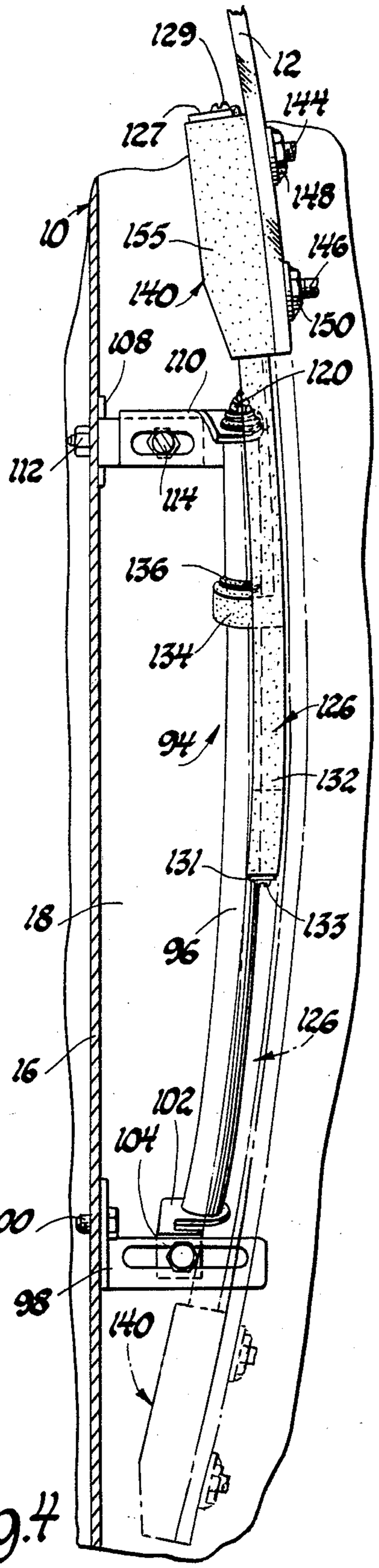
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Fig. 4

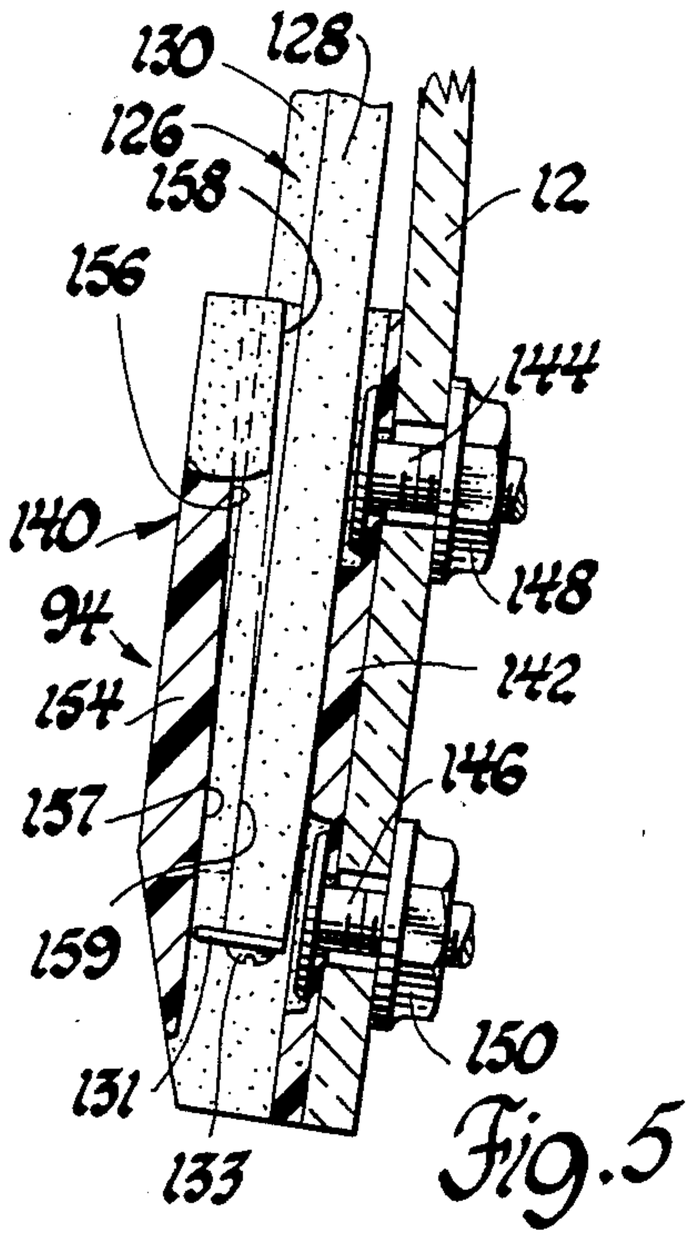

Fig.5

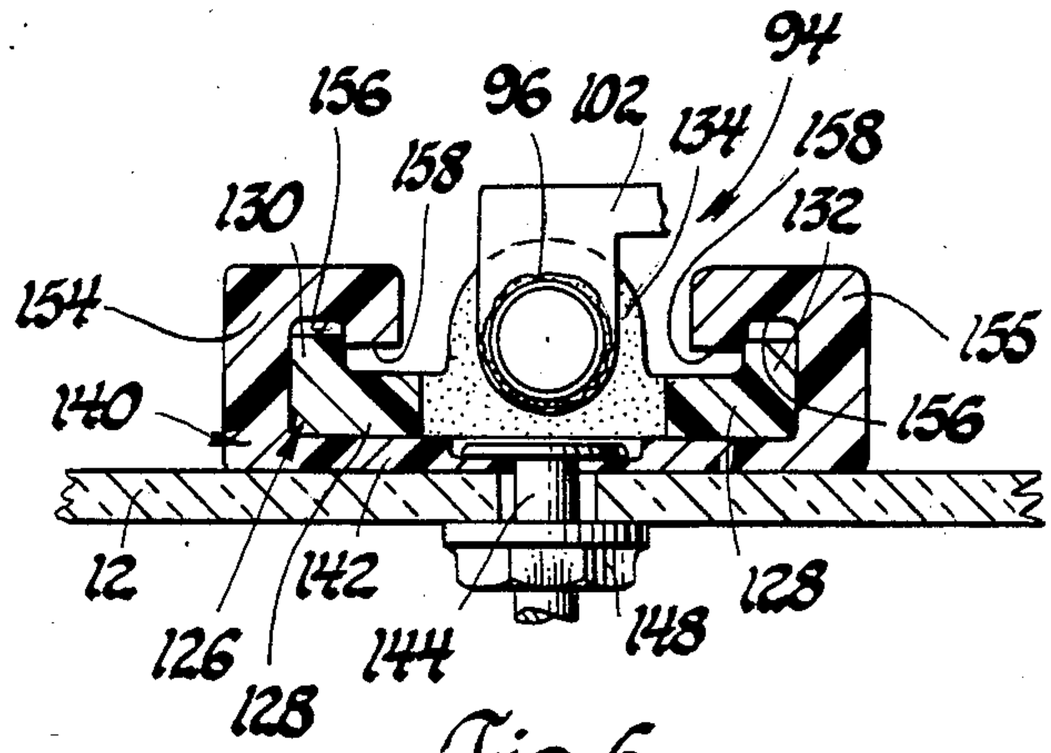

Fig.6

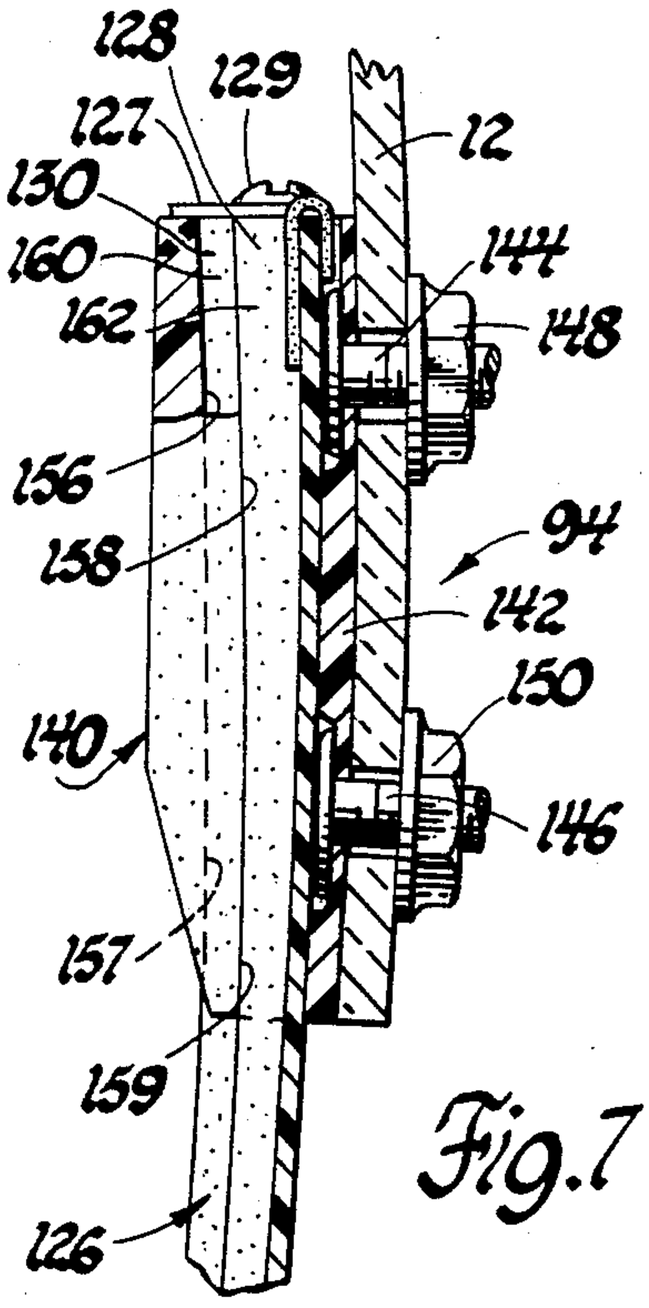

Fig.7

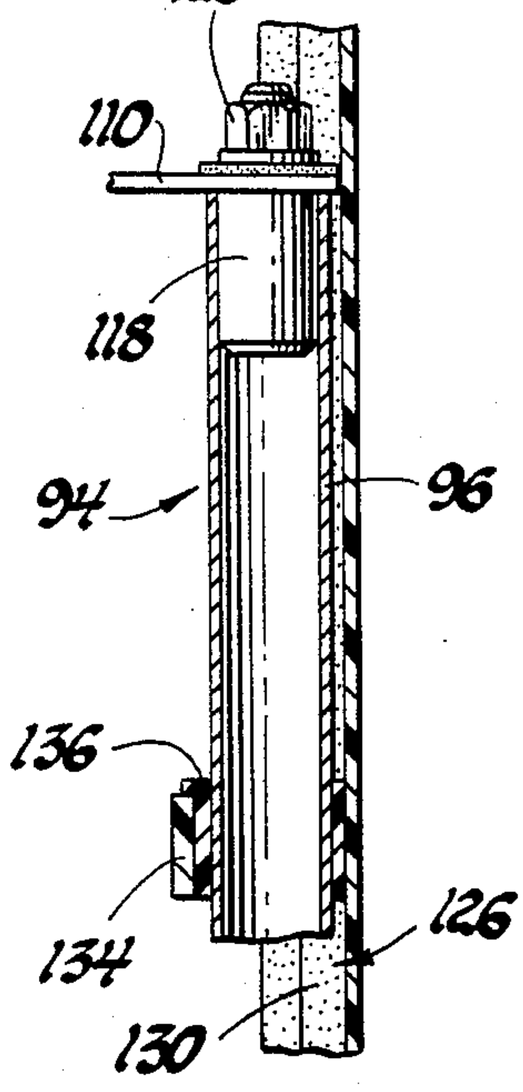

Fig.8

TELESCOPING WINDOW STABILIZING MECHANISM

The invention relates to a window stabilizing mechanism and more particularly provides a mechanism for stabilizing the lateral position of the window when in the raised position.

BACKGROUND OF THE INVENTION

It is known to provide a window regulating mechanism for moving a window between a raised position closing the window opening and a lowered position in which the window is stored in a storage cavity within the vehicle door. It is desirable to store the window as close as possible to the bottom of the storage cavity so that maximum utilization of the storage cavity may be had and accordingly the windowsill structure of the door may be at its relative lowest possible elevation.

In such vehicle window installations, particularly those which the door does not have a window frame surrounding the window opening, it is desirable to stabilize the window at its raised position so that the window will be pressed firmly inwardly against sealing strips carried by the vehicle body roof rail and the B pillar to prevent leakage of water into the body.

The present invention provides a telescoping stabilizer linkage which stabilizes the position of the window in the raised position and telescopically retracts as the window is stored so that the window may be lowered to a greater depth within the storage cavity.

SUMMARY OF THE INVENTION

According to the invention, mechanism for stabilizing the lateral position of a raised window in a vehicle door includes a guide track mounted vertically on the door within the window storage cavity thereof and having length less than the depth of the cavity with upper and lower ends spaced respectively from the top and bottom of the cavity. A stabilizer strut stands vertically along the guide track and has a central portion slidably interengaged with the stabilizer strut for vertical movement therealong between a lowered position in which the bottom of the stabilizer strut extends below the guide track and a raised position in which the top of the stabilizer strut extends above the guide track. A slider channel is attached to the window and slidably interengaged for vertical movement along the length of the stabilizer strut. The slidable interengagement between the slider channel and the stabilizer strut is characterized by tapered walls which provide a small area of frictional contact with the stabilizer strut during the sliding movement therebetween until the slider channel reaches the fully raised position with respect to the stabilizer strut at which point the tapered walls on the stabilizer strut engage with the tapered wall of the slider channel to provide a full length interengagement therebetween which functions to substantially stabilize the glass laterally of the vehicle in the fully raised position.

Thus, the object, feature and advantage of the present invention resides in a telescoping stabilizing mechanism acting between a window and a door mounted track and including a stabilizer strut which slidably interengages with both a door mounted guide track and a glass mounted slider channel, and which extends between a lowered position extending below the guide track and a raised position extending above the guide track.

A further object, feature and advantage of the invention resides in the provision of a telescoping stabilizer mechanism in which a stabilizer strut which slides along a door mounted guide track and has a slidable interfit with a glass mounted slider channel having tapered sliding contact surfaces adapted to cooperate with the facing contact surfaces of the stabilizer strut to provide a small area of frictional contact therebetween during the up and down sliding movement of the slider channel relative to the guide track and then provide a larger bearing area of contact therebetween when the slider channel reaches the fully raised position relative to the stabilizer strut to provide substantial lateral stabilizing interconnection between the slider and the stabilizer strut.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features, objects and advantages of the invention will become apparent upon consideration of the specification and the appended drawings in which:

FIG. **1** is a partially broken-away side elevation view of a vehicle door embodying a telescoping window stabilizing mechanism according to the invention, the window being shown in the raised position;

FIG. **2** is a view similar to FIG. **1** but showing the window in the lowered position;

FIG. **3** is an enlarged fragmentary view similar to FIG. **2** showing the lowered position indicated by solid lines and the raised position indicated by phantom lines;

FIG. **4** is a sectional view taken in the direction of arrows **4—4** of FIG. **1** and showing the raised position in solid lines and the lowered position in phantom lines;

FIG. **5** is a sectional view taken in the direction of arrows **5—5** of FIG. **3**;

FIG. **6** is a sectional view taken in the direction of arrows **6—6** of FIG. **3**;

FIG. **7** is a view taken in the direction of arrows **7—7** of FIG. **1** and showing the interfit between the slider and the stabilizer in the fully raised position; and

FIG. **8** is a sectional view taken in the direction of arrows **8—8** of FIG. **1**.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. **1**, a vehicle door **10** of a vehicle body is adapted for conventional hinging to the hinge pillar of the vehicle body for swinging movement between an open position and a closed position. When the door is in the closed position, a portion of the door opening is closed by a window **12** mounted on the door **10**.

As best seen in FIG. **1**, the door **10** includes an outer panel **14** and an inner panel **16** which are spaced apart to define a storage cavity **18** in which the window **12** is stored. The height of the window **12** is only slightly less than the dimension between the sill **20** of the door **10** and the bottom wall **22** of the storage cavity **18**.

A window regulator mechanism, generally indicated at **24**, is provided for moving the window **12** between a raised closed position shown in FIG. **1** and a lowered open position shown in FIG. **2**. The window regulator mechanism **24** includes a C-shaped sash channel **26** which is mounted along the lower edge of the window **12** by bolts **28** and **30**. A motor **34** is mounted on a mounting bracket **36** attached to door inner panel **16** and has a pinion gear **38** which meshes with a gear sector **40** of a regulator arm **42**. The regulator arm **42** is

mounted on the mounting bracket **36** by a pivot **46**. A roller **48** is pivotally mounted on the end of the regulator arm **42** and rides in the sash channel **26**.

The window regulator mechanism **24** also includes a guide arm **52** which is mounted on the regulator arm **42** by pivot **54**. One end of the guide arm **52** is fixedly attached to the window **12** by bolt **56**. The other end of the guide arm **52** carries a roller **58** which rides in a guide channel **62** mounted on the door inner panel **16** by brackets **64** and **66**.

The window is lowered from the raised position of FIG. **1** by energizing the electric motor **34** to pivot the regulator arm **42** downwardly. The roller **48** carried on the end of the regulator arm **42** descends along the arcuate path "Y" and lowers the rear end of the window **12**. Concommitantly, the guide arm **52** carried on the regulator arm **42** by pivot **54** moves downwardly with its one end carrying roller **58** guided in the guide channel **62** so that the other end fixedly attached to window **12** by bolt **56** descends along the straight line designated "X" to support and control the downward movement of the front end of the window **12**.

As best seen in FIGS. **1** and **2**, the front end of the window **12** is supported and guided by a channel **70** which extends from the bottom wall **22** of the storage cavity **18** to a height above the door sill **20**. The channel **70** is mounted upon the door inner panel **16** by mounting brackets **72** and **74**. A triangular patch **75** of window glass is fixedly mounted on the door adjacent to upper end of the channel **70**. A plastic upper foot **78** is bonded to the upper leading edge of the window **12** and extends into the channel **70**. A similar lower foot **86** is attached to the lower front corner of the window **12** and also slides in the channel **70**.

As the window **12** moves between the raised position of FIG. **1** and the lowered position of FIG. **2**, the upper foot **78** and lower foot **86** slide within the channel **70** to establish the lateral location of the forward end of the window **12**.

A telescoping stabilizer mechanism, generally indicated at **94**, is provided to stabilize the lateral position of the rear end of the window **12**. As best seen in FIGS. **1** and **4**, the stabilizer mechanism **94** includes a curved tubular guide track **96** which is curved to match the curvature of the window **12**. The lower end of the tubular guide track **96** is mounted on the door inner panel **16** by a bolt **104** attaching a first mounting bracket **98** attached to the inner panel **16** by bolt **100** with a second mounting bracket **102** which is welded or otherwise suitably attached to the lower end of the tubular guide track **96**. The bolts **100** and **104** ride in slots which permit vertical and lateral adjustment of the tubular guide track **96**. The upper end of the tubular guide track **96** is similarly mounted on the door inner panel **16** by mounting brackets **108** and **110** and cooperating bolts **112** and **114**. The upper end of the tubular guide track **96** is attached to the mounting bracket **110** by a threaded plug **118** and nut **120**. The tubular guide track **96** has a height less than the depth of the storage cavity **18** and is generally vertically centered in the door cavity so that the upper end is below the windowsill **20** and the lower end is above the bottom wall **22** of storage cavity **18**.

A molded plastic stabilizer strut **126** is slidably interengaged with the tubular guide tube **96**. As best seen in FIG. **6**, the stabilizer strut **126** includes a generally planar rectangular base portion **128** which has a curvature to match the curvature of the window **12** and the tubular guide track **96**. Ribs **130** and **132** project from the base **128** inwardly toward the center of the vehicle all along the length thereof. Stabilizer strut **126** also has an integrally molded ring **134** about mid-length thereon which encircles the tubular guide track **96** and receives a teflon bushing **136**. The stabilizer strut **126** is approximately the same length as the tubular guide track **96**. A stopper plate **127** is mounted on the top of the stabilizer strut **126** by screw **129**. A stopper plate **131** is mounted on the bottom of the stabilizer strut by screw **133**.

As best seen in FIGS. **3**, **5** and **6**, a molded plastic slider channel **140** is attached to the window **12** and slidably interengaged with the stabilizer strut **126** for vertical sliding movement therealong between the stopper plates **127** and **131**. The slider channel **140** includes a base wall **142** which is attached to the window **12** by an upper bolt **144** and a lower bolt **146** which respectively receives nuts **148** and **150**. Slider channel **140** also has C-shaped edge walls **154** and **155** which surround the ribs **130** and **132** of the stabilizer strut **126** to provide a slidable interconnection therebetween. The C-shaped edge wall **154** includes a tapered wall **156** facing toward the rib **130** and a tapered wall **158** which faces toward the base **128**. As best seen by reference to FIG. **5**, the taper of the tapered walls **156** and **158** is such that only the lowermost portions of these walls defines lands **157** and **159** which engage with the facing walls of the stabilizer strut **126** while the greater length of these tapered walls is spaced away therefrom so that there is only a small area of contact therebetween adding friction into the system.

As best seen in FIG. **7**, the uppermost end portion **160** of the rib **130** of the stabilizer strut **126** is tapered inwardly toward the center of the vehicle at an angle which matches the taper of the tapered wall **156** of the slider channel **140**. Likewise, the uppermost end portion of the base **128** of stabilizer strut **126** juxtaposed with the tapered wall **158** is tapered inwardly at an angle which matches the taper of the tapered wall **158**. Accordingly, as best seen in FIG. **7**, when the slider channel **140** is fully raised relative to the stabilizer strut **126**, the tapered wall **156** engages along its full length with the uppermost end portion **160** of the stabilizer strut rib **130**. Simultaneously, the tapered wall **158** engages along its full length with the uppermost end portion **162** of the stabilizer strut base **128**. The C-shaped edge wall **155** of the slider channel **140** and the base **128** and rib **132** have similar cooperating tapers which are identified by like numerals.

OPERATION

The window **12** is moved from the open position of FIG. **2** to the closed position of FIG. **1** by energizing the motor **34** of the window regulator **24**. The regulator arm **42** is thus raised and the guide arm **52** cooperates therewith to raise the window **12** therewith as described hereinbefore.

The slider channel **140** is raised with the window **12** from its lowermost position of FIG. **3** to the fully raised position of FIG. **4**. During such movement, the slider channel **140** slides upwardly along the stabilizer strut **126** and then the stabilizer strut **126** slides upwardly along the tubular guide track **96**. In some cases, depending on the friction between the parts, the stabilizer strut **126** will move first along the tubular guide track **96** and then the slider channel **140** will slide upwardly along the stabilizer strut **126**. The friction between the slider channel **140** and the stabilizer strut **126** is minimized by

having the small area of contact at the bottom only of the tapered walls **156** and **158** of the slider channel **140**. The friction between the stabilizer strut **126** and the tubular guide track **96** is minimized by the teflon bushing **136**.

When the window **12** reaches the fully raised position of FIGS. **1**, **4** and **7**, the slider channel **140** engages with the stopper plate **127** of the stabilizer strut **126** and the tapered walls **156** and **158** of the slider channel **140** engage with the stabilizer strut **126** to provide a substantial length of contact therebetween which is effective to stabilize the glass **12** against lateral movement relative to the stabilizer strut **126**. Accordingly, the glass **12** is stabilized and is forced laterally of the body into engagement with a weather strip surrounding the door opening.

Thus, it is seen that the invention provides a new and improved telescoping stabilizer mechanism for a vehicle window. The telescoping stabilizer mechanism stabilizes the lateral position of the glass in the door at the raised position thereof. The telescoping stabilizer mechanism has raised and lowered positions in which the stabilizer strut **126** and the slider channel **140** extend respectively higher and lower than the tubular guide track **96** so that the door need not be as wide at the top and bottom as would be required to receive the tubular guide track **96** in addition to the stabilizer strut **126** and the slider channel **140**.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In a vehicle body door having a window opening and a window storage cavity beneath the window opening, a window movable between a raised position closing the opening and a lowered position stored in the storage cavity, and window regulator means connected to the window for moving the window along a defined path of movement between the raised and lowered positions, a telescoping stabilizing mechanism comprising:

a guide track mounted on the door within the storage cavity;

a stabilizer strut slidably interengaged with the guide track for vertical movement therealong between a lowered position in which the bottom of the stabilizer strut extends below the guide track and a raised position in which the top of the stabilizer strut extends above the guide track;

a slider channel attached to the window and slidably interengaged with the stabilizer strut for vertical movement therealong between the top of stabilizer strut when the window is fully raised and the bottom of the stabilizer strut when the window is fully lowered; and

said sliding interfit between the slider channel and the stabilizer strut being characterized by tapered walls provided respectively thereon and facing toward one another, said tapered walls cooperating to provide a small area of frictional contact therebetween during vertical movement of the window and the slider channel with respect to the stabilizer strut and coming into full length large area contact therebetween when the window and slider reach the fully raised position to provide a substantial bearing length between the slider channel and the stabilizer strut to substantially stabilize the glass laterally of the vehicle.

2. In a vehicle body door having a window opening and a window storage cavity beneath the window opening, a window movable between a raised position closing the opening and a lowered position stored in the storage cavity, and window regulator means connected to the window for moving the window along a defined path of movement between the raised and lowered positions, a telescoping stabilizing mechanism comprising:

a guide track mounted vertically on the door within the storage cavity, said guide track having a length less than the depth of the window storage cavity within the door and having a lower end spaced above the bottom of the cavity and an upper end spaced below the top of the cavity;

a stabilizer strut slidably interengaged with the guide track for vertical movement therealong between a lowered position in which the bottom of the stabilizer strut extends below the lower end of the guide track and a raised position in which the top of the stabilizer strut extends above the upper end of the guide track;

a slider channel attached to the window and slidably interengaged with the stabilizer strut for vertical movement therealong between the top of the stabilizer strut when the window is fully raised and the bottom of the stabilizer strut when the window is fully lowered;

said slidable interengagement between the slider channel and the stabilizer strut being provided at least in part by a tapered wall structure carried by the slider bracket and having a lowermost end portion thereof slidably interengaging with the stabilizer strut to provide a small length of frictional contact therebetween during vertical movement of the window and slider channel with respect to the stabilizer strut; and

said stabilizer strut having a tapered wall structure at the upper end thereof adapted to engage the tapered wall structure carried by the slider channel when the slider channel reaches the fully raised position with respect to the stabilizer strut to thereby provide a greater length of contact between the stabilizer strut and the slider channel to substantially stabilize the lateral position of the raised window.

3. In a vehicle body door having a window opening and a window storage cavity beneath the window opening, a window movable between a raised position closing the opening and a lowered position stored in the storage cavity, and window regulator means connected to the window for moving the window along a defined path of movement between the raised and lowered positions, a telescoping stabilizing mechanism comprising:

a tubular guide track mounted vertically on the door within the storage cavity, said tubular guide track having a length less than the depth of the storage cavity and a lower end spaced above the bottom of the cavity and a top end spaced below the top of the cavity;

a molded plastic stabilizer strut of generally the same length as the tubular guide track and having an integral ring portion mid-length thereof encircling the tubular guide track for vertical movement therealong between a lowered position in which the bottom of the stabilizer strut extends below the tubular guide track and a raised position in which

the top of the stabilizer strut extends above the tubular guide track;

a slider channel attached to the window and slidably interengaged with the stabilizer strut for vertical movement therealong between the top of stabilizer strut when the window is fully raised and the bottom of the stabilizer strut when the window is fully lowered; and

said interengagement between the slider channel and the stabilizer strut being characterized by tapered walls provided respectively thereon and facing toward one another, said tapered walls cooperating to provide a small area of frictional contact therebetween during vertical movement of the window and the slider channel with respect to the stabilizer strut and coming into full length contact therebetween when the window and slider reach the fully raised position to provide a substantial bearing length between the slider channel and the stabilizer strut to substantially stabilize the glass laterally of the vehicle.

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